MGL Avionics

Flight Planner

For the Stratomaster Enigma EFIS

Preliminary user manual 12 December 2006

Please note: This software package is in development and not functionally complete.
Functions and features are added continuously as development progresses. Please download
the latest version from our website at www.MGLAvionics.co.za

General

Enigma Flight Planner has two main purposes:

1) Maintain waypoint and airport databases and allow export of these databased into a file format suitable for direct use with the Enigma EFIS system

2) Plan and create route files (Flight plans) for use with an Enigma EFIS system.

The current system is functional but fairly basic. Future extensions planned will include aircraft performance items (fuel burn, range, speeds) and flight plan additions as well as printing facilities which are currently lacking.

The goal of this development is to bring to you a complete and comprehensive flight planning program that works Word Wide and is ideally tailored to the needs of your Enigma EFIS installation.

Planned functionality extensions for Flight Planner

1) Flight log import, editor and viewer for Enigma flight log data

2) GPS track log viewer to view the track log created in your Enigma

3) Aircraft performance specifics for flight plan purposes

4) Wind and "what if ?" calculations

5) Flight plan printing with airport details

6) Map and route printing

Importing waypoint and airport data

Currently, Enigma can import from two sources of data:

1) A text file format

2) Waypoint data downloaded in GPX file format from www.Navaid.com

If you import a waypoint that has been defined before, using the waypoint short name, Flight Planner will not add the new waypoint to the database but instead change any fields in the existing record to reflect the data contained in the new import.

Text file format

This format is a fairly simple text format. The format specification is given in the appendix to this document.

GPX file format

The GPX file format is a XML format adopted for interchange of GPS waypoint information. Flight Planner accepts the format published by www.Navaid.com. On this website, you can specify a region and download waypoints of your choice which includes airports and navaids. Download a GPX file and import this file into Flight Planner.

Enigma data files

In order to fully utilize the built in mapping facility, it is recommended to install Enigma map and airspace information files.

Copy the terrain files (*.DEM) and all map files (files with names like N30W120b.M64) into the maps folder of your Flight Planner installation. Also copy the file MapIndex.MM0 into the same folder. For example:
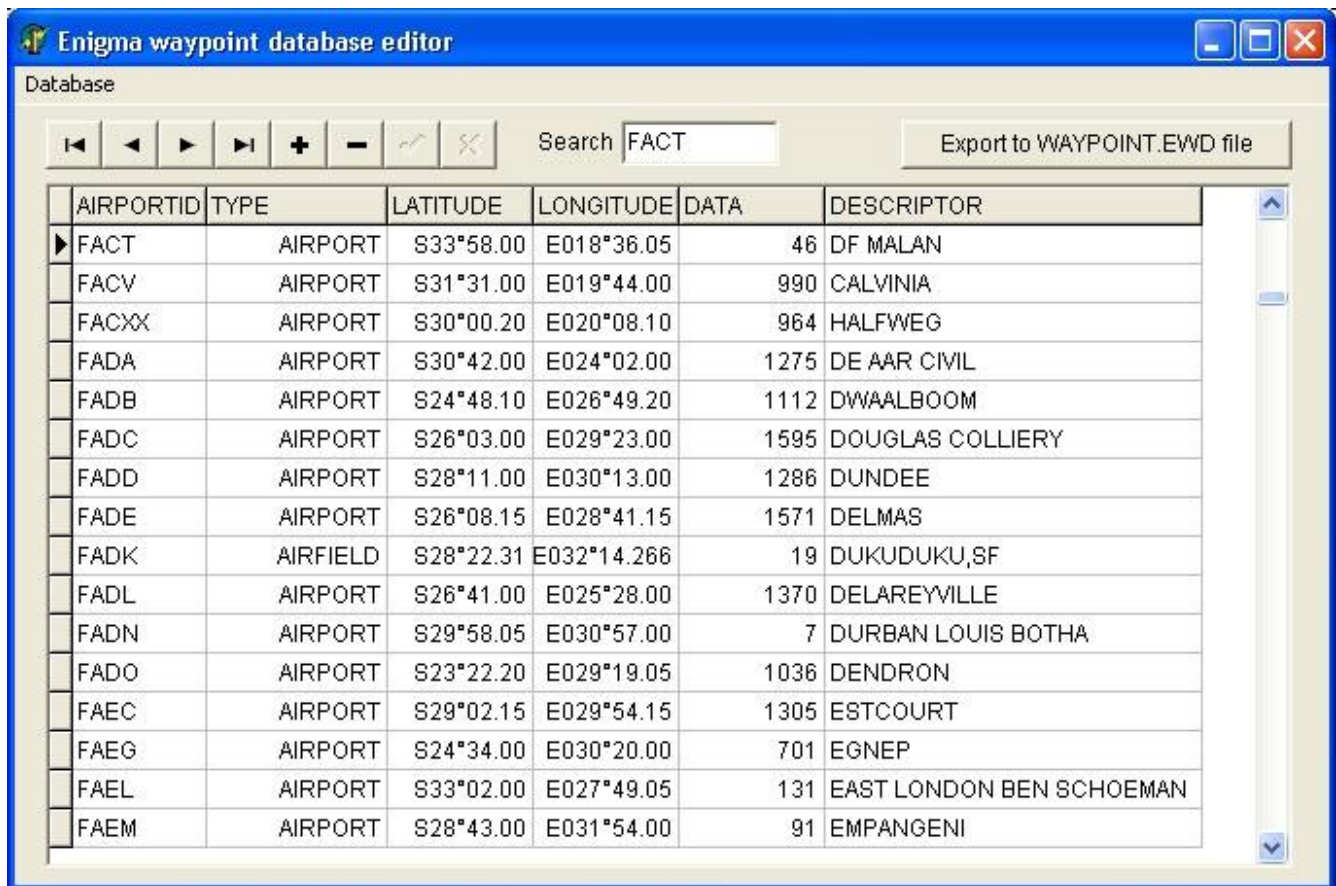C:\Program Files\Enigma Tools\Enigma FlightPlanner\maps

Copy the airspace.evd file to the data folder, for example:
C:\Program Files\Enigma Tools\Enigma FlightPlanner\Data

To show your waypoints and airport data on the flight planner, these need to be imported into your Flight Planner databases.

Waypoint database editor

Use the database editor to add, edit or delete waypoints from your database. You can also erase the complete database using the function available under the database menu.

AIRPORTID	TYPE	LATITUDE	LONGITUDE	DATA	DESCRIPTOR
FACT	AIRPORT	S33°58.00	E018°36.05	46	DF MALAN
FACV	AIRPORT	S31°31.00	E019°44.00	990	CALVINIA
FACXX	AIRPORT	S30°00.20	E020°08.10	964	HALFWEG
FADA	AIRPORT	S30°42.00	E024°02.00	1275	DE AAR CIVIL
FADB	AIRPORT	S24°48.10	E026°49.20	1112	DWAALBOOM
FADC	AIRPORT	S26°03.00	E029°23.00	1595	DOUGLAS COLLIERY
FADD	AIRPORT	S28°11.00	E030°13.00	1286	DUNDEE
FADE	AIRPORT	S26°08.15	E028°41.15	1571	DELMAS
FADK	AIRFIELD	S28°22.31	E032°14.266	19	DUKUDUKU,SF
FADL	AIRPORT	S26°41.00	E025°28.00	1370	DELAREYVILLE
FADN	AIRPORT	S29°58.05	E030°57.00	7	DURBAN LOUIS BOTHA
FADO	AIRPORT	S23°22.20	E029°19.05	1036	DENDRON
FAEC	AIRPORT	S29°02.15	E029°54.15	1305	ESTCOURT
FAEG	AIRPORT	S24°34.00	E030°20.00	701	EGNEP
FAEL	AIRPORT	S33°02.00	E027°49.05	131	EAST LONDON BEN SCHOEMAN
FAEM	AIRPORT	S28°43.00	E031°54.00	91	EMPANGENI

Each waypoint has a data record. The use of this depends on the waypoint type. For airports, this is the elevation (currently fixed in feet). For navaids, this is the frequency in Mhz. Intersections have the value 0 (the data is not used for anything).

Waypoints need to be uniquely identified by the ID. The ID is from one to six characters in size and is typically used for ICAO identifiers. The ID must be unique for every waypoint or else you will cause a "key violation" and your edit/addition will not be accepted.

Airports database editor

Use the airports database editor to add, edit or delete airport information records. Please note that in the Enigma scheme of operation, every airport record needs a corresponding waypoint identified as airfield. You may view the airport record as an extension to the waypoint record for that airfield. Airport records contain information on frequencies and runways.

The airport record contains extended runway information that includes data for GPS aided approaches. This data is not yet imported with current software versions. It is expected that GPS aided approach functionality will be added soon to the Enigma system.

Exporting waypoint and airport data

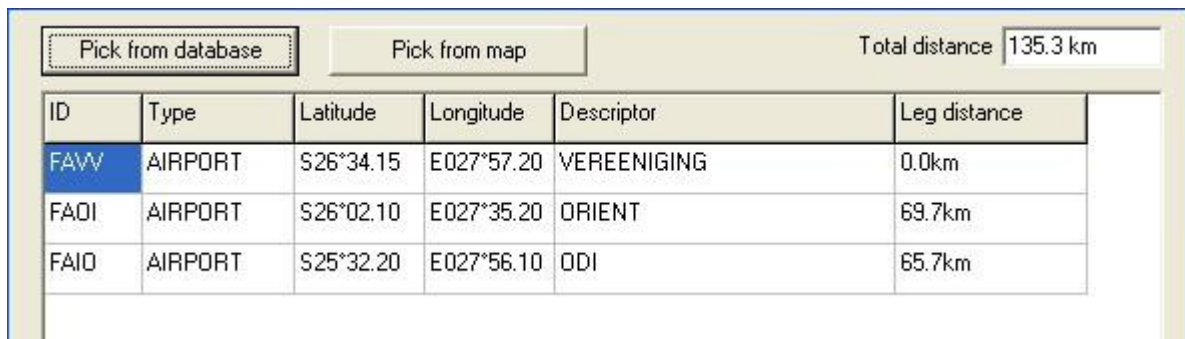You can export part or all of your waypoint and airport data to Enigma file format. You do this by specifying a region and groups of waypoint types to export.

You can save export filters you have created for future use. You might need to use filters if you have a very large database but would like to use small exported files to cover a specific region only.
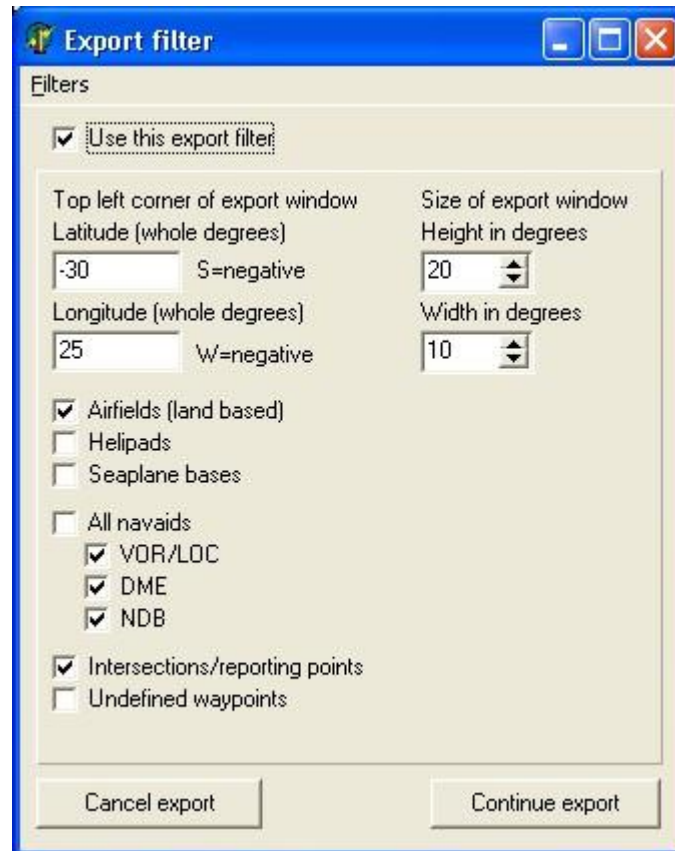
Creating and editing routes

Creating, editing, copying and deleting routes are options under the routes menu.

Within the route editor, you can select waypoints directly from the map or from the waypoint database. In either case, waypoints are simply dragged and dropped into the route editor at the desired location. The current route will also be shown on the map.

If you drag a waypoint from the map, you have two options: Dragging a waypoint symbol will insert this waypoint into your route. If you drag from a location on your map that does not have a waypoint, a new waypoint is created on the fly with the name "waypoint" and added or inserted into your route (depending on the location you drop it). The newly created waypoint is known only to your route, it is not created in the waypoint database. (Enigma's route functionality allows waypoints that are not defined in any waypoint database).

Right click on any route entry to delete it or move it up or down in the list.

Notes on dragging waypoints:

Dragging waypoints from the map – locate cursor over the desired location and right click and hold, then move to the route editor and release the right mouse button over the desired location.

Dragging waypoints from the database – left click on the desired waypoint, then move the cursor to the route editor and left click on the desired location where you want to drop the waypoint.

Using routes in Enigma

Routes are created directly in Enigma route format. The routes normally reside in the same folder that is used by your Flight Planner executable. They have the file extension ".ert" and can be copied into your Enigma RAM disk from where you can activate them.

Using airspace information

If you have installed a airspace.evd file for your area (download from our website at www.MGLAvionics.co.za), Flight Planner can draw the airspaces on your map (select map mode in "setup").

If you click on any location on the map, you get a small menu of options. Select "report on airspaces".
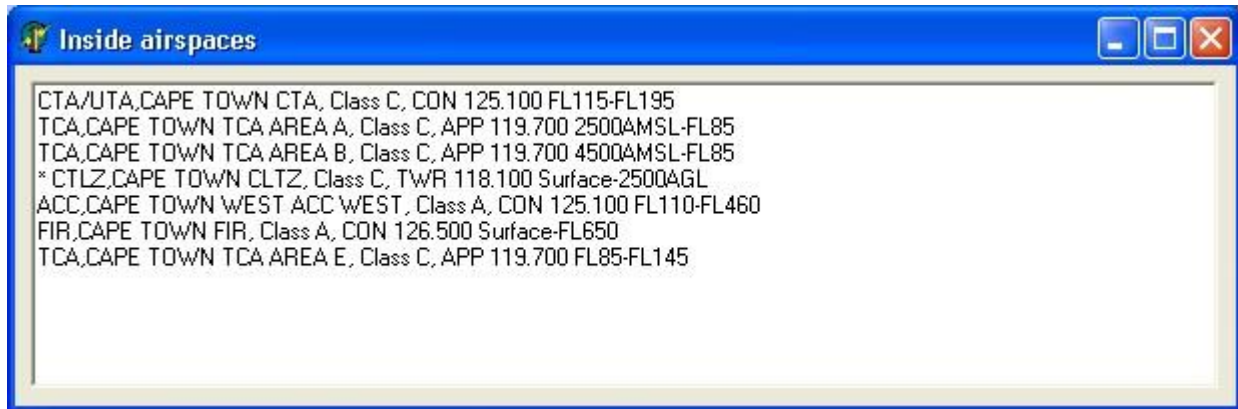
You will get a list showing all airspaces for consideration at that location and any known information on those airspaces.

The airspace marked "*" is the airspace with the smallest physical area in the region that you clicked on and most likely the one you are interested in. This airspace is also highlighted on the map.

This works in reverse as well. If you click on any of the airspaces on the list of "inside airspaces", the corresponding airspace outline on the map is highlighted.

Distance and bearing

Flight planner contains an easy to use distance and bearing calculator that works right from the map. Click on any two locations and select "select this point". Flight planner will give you a very accurate result regardless of distance as Flight Planner takes the exact curvature of the Earth into account (using WGS84 survey data).

Appendix

Text file format specification

Valid field separators are spaces, tabs, and commas. A comma should be used when a nav/comm frequency is not known. See examples below.

- First character is type (must begin in column one). Values "+',"-"," " (space) and "/" which denotes a comment.

- Next five characters id (must be in columns two through six).

- ABCDE Airport

 ABCDE Navaid (space in column one)

+ABCDE Intersection

/ Comment field

LATITUDE / LONGITUDE format

Two formats are accepted - degrees, minutes, hundredths of minutes and degrees, minutes, seconds, and tenths of seconds. For example:

  23 45.67 S   (dd mm.hh - hundredths)

  23 45 67.8 S

  123 45.67 E (dd mm ss.t - tenths)

  123 45 67.8 E

MAGNETIC VARIATION

One or two digits with a sign of either East or West (no spaces in between). For example:

  12E

  03W

  5E

  1W

NAVAID TYPES

must be one of the following:

1.   LFR
2.   NDB
3.   NDB/DME
4.   UHF-NDB
5.   M-NDB   (marine)
6.   M-NDB/DME (marine)

7. VOR
8. VOR/DME
9. VORTAC
10. TACAN
11. FAN-MKR
12. LOM
13. LMM
14. LOC/SDF
15. MLS/ISMLS

RUNWAY descriptors

00-36　(heading)

L or R　(in case of dual runways)

S,K,G,C,T or I (Sand,Gravel,Grass,Concrete,Tar,Ice)

AIRPORT record format

ID　　　up to five characters

LATITUDE

LONGITUDE

MAGVAR

FREQ　　　123.475 (MHz)

ELEVATION　in feet above mean sea level

NAME　　　up to 15 characters

RUNWAY1

RUNWAY2

RUNWAY3

NAVAID record format

ID　　　up to five characters

LATITUDE

LONGITUDE

MAGVAR

FREQ　　　123.475 (MHz)

TYPE　　See above.

PWR　　Service volume: *, T, L, or H.

ELEVATION　in feet above mean sea level

NAME   up to 15 characters

INTERSECTION record format

ID   up to five characters
LATITUDE
LONGITUDE
MAGVAR

Example airport record:
-FAAD   32 41.0 S 026 18.0 E   22W 124.800,   1966 ADELAIDE
Example navaid record (note space before ID):
 HBV   25 40.5 S   027 50.0 E   16W 112.100,   VOR *   HARTEBEESPOORT DAM
Example intersection record:
+2557S 25 57.0 S   028 29.0 E   17W /WATERKLOOF CTR TO ERMELO/PIET RETIEF